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Nutrition and the elderly residents of a private nursing home in the Blue Mountains

Dearne Thorne
University of Wollongong

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UNIVERSITY OF WOLLONGONG
Department of Public Health and Nutrition



NUTRITION AND THE ELDERLY
RESIDENTS OF A PRIVATE NURSING HOME IN THE
BLUE MOUNTAINS

by
DEARNE THORNE
B.Sc, Student MDAA

A major project conducted as part of Masters of Science Nutrition and
Dietetics Degree.

SUPERVISOR: Jennifer Mc Arthur

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Dearne.

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ABSTRACT

The elderly people of Australia are a growing sector of the population. It is the elderly, especially the institutionalised elderly who are at high risk of undernutrition and other nutrition related problems. At present nutrition information on the institutionalised in Australia is very limited. This study assesses both the nutritional adequacy of the menu and dietary intake of the elderly residents (n=48) of a 64 bed private nursing home in the Blue Mountains area.

The mean Body Mass Index (BMI) was 22.5 (range 15.2-->45). Forty-six percent were under weight of which 54 per cent were very underweight. BMIs were shown to be independent of medical condition or mobility level.

The menu did not meet 100 per cent of the Australian Recommended Dietary Intake (RDI) for both elderly men and women for fibre and zinc. Sixty-five percent of the residents experienced constipation and with the majority taking aperients on a regular basis. Magnesium did not meet the RDI for elderly men. Visual assessment of food intake revealed the maximum number of people to consume the entire menu was 50 per cent for both breakfast and lunch, and 29 per cent for the evening meal. Neither mobility level or medical diagnosis proved to have an impact on food intake.

The standard menu was adequate in most nutrients, however not all the residents consumed the minimum amount of food necessary to ensure an adequate nutritional intake. No specific 'sub-groups' within the study

population were identified as being at higher risk of undernutrition. It is concluded that nutritional needs of each resident are very individual, and the focus needs to be directed more towards the individual and their level of food intake and not so much the menu in the development of future studies and intervention plans.

CHAPTER ONE

INTRODUCTION

1.0 INTRODUCTION

Nutrition is especially important for maintaining health and quality of life in the elderly population. The process of aging itself puts this group at high risk for the development of nutrition related problems. The elderly often have increased susceptibility to chronic diseases, age related decreased organ function and consume a multiple number of medications, which in turn can effect the absorption, transportation, metabolism and excretion of nutrients, as well as the quantity of food consumed. Deteriorating mental status and other psychological disorders can also interfere with food intake.(ADA Reports, 1987)

The institutionalised elderly have been shown to be a group at even greater risk of undernutrition.(Rudman and Feller, 1989). This is not so surprising when you consider that as a group they have a higher incidence of illness and physical disability than the community living elderly. Elderly residents in long term care/nursing homes are relieved of problems likely to be faced by elderly in the community (such as reduced finances, poor access to shops, social isolation, inadequate skills in cooking and limited nutrition knowledge), however their food intake is dependent on the time and presentation of the meals, the environment in which they are served, nursing support with feeding, manual skills and intact mentality. (Nguyen, et al, 1985)

In 1971 the elderly represented 8.3 per cent of the total population. Figures from 1992 show the elderly now represent 11.4 per cent and are projected to reach 15.6 per cent by the year 2021.(ABS, 1985; ABS, 1991 and

1992) It is of concern that the Australian population is aging, not only for a nutritional reasons, but financially as well. With the increasing number of elderly, there will be a need for larger shares of public funding for health services and there may be increases in the number of elderly people who require the specialist care found only within a nursing home.(Commonwealth Dept. Health, Housing And Community Services, 1992; Dawe, 1993)

At present approximately five percent of the elderly are institutionalised. In Australia there are close to 1500 Nursing homes (about 74 500 beds). Within NSW alone there is now over 500 nursing homes, providing over 30 000 beds. (Commonwealth Dept. Health, Housing & Community Services, 1992)

The Commonwealth Government produces the 'Nursing Home Outcome Standards' to ensure that private nursing homes offer a high standard of resident care. Funding is provided on the basis they adhere to these standards. Within these standards the subject of nutrition is barely touched upon, rather the standards have a greater emphasis towards individual rights and the consideration of personal likes and dislikes.

The Department of Community Services and Health produces the 'Guidelines For Nutritional Care and Food Service in Nursing Homes'. These Guidelines recommend that meals follow the Five Food Groups and the Australian Dietary Guidelines; residents should be exposed to sunlight or receive 5-10ug Vitamin D per day; a dietitian be involved in

menu planning, planning and implementing diet regimes and counselling residents where special diets are necessary; residents be weighed on admission and weekly there-after; cyclic menus be a minimum of three weeks and meals to be served within set times.(Department Of Community Services and Health, 1984)

The participating nursing home for this study is located in the Blue Mountains, NSW. It is privately owned and contains 64 beds. The building has a two levels, the top being for those who have greater mobility. The majority of residents cover expenses with their pension and the Commonwealth Government provide some financial funding. Although documentation of the exact amount could not be found, the meal allowance has been estimated at approximately three dollars per day per person. Catering personnel have the challenging task of producing economic, nutritious meals, while at the same time minimising wastage.

At present information on the nutritional status of Australians over 65 years of age is limited. This study will look at the dietary intake and anthropometric measurements of the elderly residents of a private Nursing Home. The study will not only assist in providing additional data on the over 65's in Australia, but will also seek to identify specific groups of the institutionalised elderly at risk of malnutrition and offer recommendations aimed at improving the nutritional status of elderly in long-term care facilities. Administration and staff for the participating Nursing Home and associated health professionals have expressed their full support of the study and keen interest in the nutritional well being of its residents.

1.1 AIMS OF THE PROJECT

1. To determine;
 - a) If the standard menu is nutritionally adequate for the elderly residents of the nursing home.
 - b) Whether the residents are consuming the minimum amount of food necessary to ensure an adequate nutritional intake.
2. To identify specific groups within the study population at greater risk of undernutrition.

1.2 RESEARCH QUESTIONS

1. Does the nursing home menu meet 100% of the RDI for all identified nutrients for the reference person >65 yrs?
2. What are the mean BMI values for the sub-groups within the study population? Is there a significant difference between the sub-groups?
3. Are there observable differences in the amount of foods consumed, between different mobility levels of subgroups, and between those who are assisted at meals and those who are not ?

1.3 LIST OF DEFINITIONS

ELDERLY = Person above 65 years of age.

1.4 LIST OF ACRONYMS

BMI = Body Mass Index.

CVA = Cardio/Cerebral -Vascular Accident.

RDA = Recommended Daily Allowances.

RDI = Recommended Dietary Intake.

CHAPTER TWO

LITERATURE REVIEW

2.1 PHYSIOLOGICAL CHANGES WITH AGING

Aging in itself can effect the nutritional well being of the elderly, through decreased food intake, decreased organ function, altered absorption, utilisation and excretion of nutrients. Kidney function also declines long with the glomerular filtration rate, as a result nutrients are less efficiently reabsorbed while drugs and metabolic wastes are less efficiently excreted.(Schlenker, 1992) Metabolic rate and physical activity decreases which results in reduced energy requirements. Body composition alters and there is a loss of lean body mass and height. Body muscle mass represents 45 percent in the young adult and decreases to 27 percent of body weight beyond 70 years of age. (Fisher et al., 1990).

Irregular bowel habits and constipation is a frequent problem especially of the elderly nursing home population. The prevalence of constipation increases in the elderly due to a decline in gastric motility, increased gastric atrophy, low fluid and fibre intake and reduction in physical activity.(Baghurst et al., 1985; ADA, 1987) Other gastrointestinal changes associated with aging are the reduction in pancreatic secretion, secretion of digestive enzymes, intrinsic factor and hydrochloric acid, which can reduce the absorption of vitamin B12, iron, and calcium.(Institute Of Food and Technology, 1986)

Oral changes that occur with aging include the degeneration of salivary glands, resulting in less saliva, making swallowing more difficult. Chewing is slower and less effective and can be exacerbated by loss of teeth or poorly fitting dentures. Flavour sensations decrease and food may taste

bland and unappetising due to the reduced sensitivity of tastebuds and smell.(Wahlqvist, 1988) Poor vision may also decrease the enjoyment of eating, along with making the task more difficult. Cataract is the most common condition affecting visual function in the elderly people. (Rosenberg and Miller, 1992)

Normal eating requires more than the serving of complete nutrition. For the institutionalised elderly many of the eating functions are disturbed. They also have to contend with the above physiological changes which are often more advanced, a higher incidence of chronic disease, illness, and mental and physical disability.(Rudman, et al., 1989). These all play a critical part in determining their nutritional well being and state of health.

2.3 UNDERNUTRITION IN THE ELDERLY

The high prevalence of undernutrition in the elderly has long been recognised. Those elderly with low body weight and/or weight loss have the highest risk of mortality and morbidity. Of the two, weight loss is considered the most sensitive indicator of undernutrition. (Fisher and Johnson, 1990). Associated with undernutrition are complications such as increased risk of femur fracture, pneumonia, hypothermia, pressure sores and impaired immunity. (Lehmann, 1989).

There are a number of useful warning signs which may be used to identify the presence or risk of undernutrition in the elderly.(Davies, 1989) (See table 2.1)

Table 2.1 Risk Factors Of Undernutrition (Davies, 1989)

Recent weight change >3kg	Missing meals or drink
Chewing/swallowing difficulties	Food wastage/rejection
Post gastrectomy	Lack of fruit, juice, fresh vegetables
Physical disability	Lack of sunlight
Depression/loneliness	Low budget for food
Mental confusion	Poor nutritional knowledge
Side-effects of medication	High alcohol intake

The number of infectious illnesses can determine the degree of protein-energy malnutrition. Emaciation, particularly when associated with illness or injury, increases the risk of mortality and morbidity and may cause a negative nitrogen balance that may last for up to a month. (Chumlea, et al., 1987; Rudman and Feller, 1989).

Depression and dementia are the two most frequent psychological disorders of later life. Demented elderly often have a low food intake as a result of memory loss, disorientation, impaired judgement, apathy and combative feeding behaviour. Those who wander, pace and/or have agitated movements may have increased energy requirements. Confusion and poor cognitive functioning have been linked with deficiencies in folate, thiamine and vitamin B12. Correcting for these

deficiencies have been shown to have a reverse effect, bringing about improvements in mental status.(Lehmann, 1989; Fisher and Johnson, 1990; Rosenberg and Miller, 1992)

The aged are particularly vulnerable to adverse nutritional affects from drug therapy, and it is the elderly who are among the chief consumers of pharmaceutical drugs. Some of the commonly used drugs are analgesics, cardiac drugs, diuretics, anticonvulsants, antinfective agents, laxatives, antacids, antidepressants and sedatives. Many drugs have the ability to cause loss of appetite, anorexia, nausea, vomiting, diarrhoea and constipation, while others interfere with nutrient absorption and utilisation.(Fisher et al., 1990)

Examples of some drug/nutrient interactions include; the prolonged use of analgesics which can result in gastrointestinal bleeding and depletion of iron stores and in the long term, anaemia; and the use of antacids which increases the gastric pH, and inactivates thiamine and hinders the absorption of iron and folic acid. Those containing aluminium can cause phosphate depletion, lead to accelerated bone loss and muscle weakness.(Schlenker, 1992) Laxative abuse not only alters nutrient absorption, but may cause depletion of sodium and potassium. Diuretics lead to depletion of potassium, folic acid, vitamin B6, or zinc depending on the drug. Anticonvulsants increase the catabolism of vitamin D. (Lehmann, 1989)

2.2.1 Undernutrition In The Institutionalised Elderly

The elderly who are institutionalised are at greatest risk of weight loss and malnutrition, due to the higher incidence of acute/chronic disease, physiological changes/disabilities seen with aging, psychological disorders (such as dementia, depression and schizophrenia), general lack of interest in food and the effect of drug/nutrient interactions. (Fisher, et al., 1990).

Goodwin (1989) found in comparison to community dwelling elderly, in the institutionalised, obesity is rare, and 50 per cent are underweight and show evidence of protein-energy malnutrition. This was also supported by Fisher, et al. (1990) who found the incidence to range from 50 to 85 per cent.

Dwyer, et al., (1987) studied weight and body mass index (BMI) and found 30 percent institutionalised elderly had weight loss of 4.5 kg or more in a two year period. These residents were shown to have a lower four year survival rate than those who maintained or gained weight. An Australian study looked at a group of institutionalised elderly and found 29 per cent of residents had a BMI less than 20.(Zador, et al., 1990) However the incidence is most likely much greater than the figure reported, as those at highest risk of being malnourished were excluded from the study.

In a number of circumstance Protein-energy malnutrition has no correlation with dietary intake in the institutionalised elderly person. It has been proposed the cause is due to increased requirements secondary to multiple infections and other illness, rather than an inadequate food

intake.(Goodwin, 1989; Rudman et al., 1989). In hospitals elderly patients with chronic malnutrition often die of infections, most commonly pneumonia and sepsis.(Finn, 1992) Undernutrition as a result of poor dietary intake has been associated with pressure sore risk among institutionalised elderly. Bergstrom and Braden (1992) found dietary intake of all nutrients was lower among subjects who developed pressure sores. They found a low dietary protein intake to be the best predictor for pressure sores.

Dementia may be present in as many as half of the nursing home residents. Sanderman et al. (1987) reported 50 percent of the institutionalised elderly subjects with dementia were protein-energy malnourished and that they had four times as many infections as those who were well nourished.(Sanderman, et al., 1987). In another similar study a higher incidence of underweight elderly with dementia was found on admission to the nursing home and this group had greater weight loss over time than the control group.(Franklin and Karkeck, 1989)

Loss of independent eating is not uncommon in the institutionalised elderly and can greatly influence food intake. Nursing staff often have to feed three or more feeding dependent residents in succession. Feeding residents properly requires 30-45 minutes, a length of time which is often not available in many nursing homes due to staff shortages. Palatability of the food may be reduced, hot foods may become cold, or cold foods become warm, while waiting for others to be fed .(Rudman et al., 1989) In a study by Seibens and associates (1986) no correlation with weight loss or dietary intake and dependency status was shown, however there was a

correlation with disability and dependency.(Seibens, et al., 1986). In contrast a study in Victoria, Australia recorded actual food intake and found independent nursing home residents have a less nutritionally adequate diet than those who were supervised at meal times.(Nguyen et al., 1985)

2.3 NUTRIENT REQUIREMENTS AND INTAKE IN THE ELDERLY.

Recommended Dietary Intakes (RDIs) are levels of nutrients known to meet the needs of a healthy population. They are scientifically based on estimates of requirements for age and sex and incorporate a generous safety factor. (NHMRC, 1991).

In Australia there are no RDIs which specifically examine the elderly. At present all elderly people fall within the categories; males >64yrs and females >54yrs (See Table 1.1). Physiological changes and health status of the 65 to 75 year olds is very different from those who are 80 to 90 and aging itself is a variable process, both in the speed and the way it affects people. The elderly often have a number chronic diseases and take numerous medications which may increase their nutrient requirement. Very little is known about the changing nutrient needs of the elderly and it is debated as to whether the current RDIs are appropriate. (Schneider, et al., 1986)

In brief the only RDIs for elderly people which differ from younger adults are; energy, B vitamins (1,2,6,Niacin), Iron(females only) which is decreased and calcium (females only) which is increased. (See Table 1.1)

Table 1.1 Recommended Dietary Intakes. (NHMRC, 1991).

NUTRIENT	MEN		FEMALE	
	19-64 yrs	64 + yrs	19-54 yrs	54+ yrs
Vitamin A (ug)	750	750	750	750
Thiamine(mg)	1.1	0.9	0.8	0.7
Riboflavin (mg)	1.7	1.3	1.2	1.0
Niacin(mg)	19	16	13	11
Pyridoxine(mg)	1.3-1.9	1.0-1.5	0.9-1.4	0.8-1.1
Total Folate(ug)	200	200	200	200
B12 (ug)	2.0	2.0	2.0	2.0
Vitamin C (mg)	40	40	30	30
Vitamin E (mg)	10	10	7	7
Zinc(mg)	12	12	12	12
Iron(mg)	7	7	12-16	5-7
Iodine(ug)	150	150	120	120
Magnesium(mg)	320	320	270	270
Calcium(mg)	800	800	800	1000
Phosphorus(mg)	1000	1000	1000	1000
Selenium(ug)	85	85	75	75
Protein (g)	55	55	45	45
Sodium(mg)	920-2300	920-2300	920-2300	920-2300
Potassium(mg)	50-140	50-140	50-140	50-140

Evidence supports aging of the elderly affects the requirements for certain vitamins. The American 1989 Recommended Dietary Allowances (RDAs) for elderly people were reported as being too low for vitamin D,

riboflavin, vitamin B-6, and vitamin B-12, and too high in vitamin A. (Russell and Suter, 1993).

In comparison to the RDAs, the Australian recommendations for the above nutrients is similar, except for vitamin A which is lower and close to the 700mg Retinol Equivalents which has been noted as more appropriate recommendation for the elderly.(Russell and Suter, 1993).

Past Australian studies of elderly people in the community or in institutions have shown they often have diets lacking in one or more nutrients. This is also supported by overseas studies. In a group elderly people who received meals from either Meals On Wheels or an activity centre in inner Sydney, low intakes of protein, calcium, thiamine, riboflavin, ascorbic acid and iron were found in a large proportion of elderly.(Stuckey et al., 1984)

Flint and colleagues in 1978 compared serum nutrient levels of community based and institutionalised elderly people in Melbourne and concluded the institutionalised elderly were of poor nutritional status. The levels of the following nutrients; ascorbic acid, folate, albumin, and zinc were significantly lower in the institutionalised subjects compared to the community living elderly.(Flint, et al, 1979).

Studies which examined the dietary intake of the institutionalised elderly, found the nutrients; folate, iron, zinc, ascorbic acid, B group vitamins, and fibre to be at greatest risk (significantly less than the recommended intake) (Bahurst et al., 1985; Nguyen, et al., 1985; Zador, et al., 1990)

The dietary intake of a group of institutionalised elderly in the Blue Mountains was inadequate in the nutrients discussed above plus vitamin D and E. However plasma nutrient levels were within the normal ranges, and hence Zador et al,1990 concluded that this elderly group had an adequate nutritional status.(Zador et al., 1990) It should be noted that this study excluded subjects who were bed ridden, unwell, handicapped, or unsociable, all subjects considered to have the highest risk of malnutrition.

The elderly often have impaired skin synthesis of pre-calcholecalciferol and changes in metabolism of vitamin D, and institutionalised elderly often do not get enough exposure to ultraviolet rays from the sun which contribute to poor vitamin D status.(Feldman, 1993; Russell and Suter, 1993) Dietary sources make a limited contribution and so exposure to sunlight is the principle source of vitamin D. Vitamin D is important not only for bone formation but it also plays an important role in the homeostasis of calcium and its uptake from the gastrointestinal tract. Deficiency leads to osteomalacia and increase risk of bone fractures. (NHMRC, 1991) For those who are house bound or elderly in nursing homes an oral supplement of 5-10 μ g per day if not exposed to 1-2 hrs per week of direct sunlight is recommended.(NHMRC, 1991)

In a recent study of 13 Nursing homes in the Central Sydney area, it was found that only a small number of residents used outdoor facilities and no vitamin D supplements were given at any Nursing home. A plate wastage survey showed that the highest food consumption was at breakfast followed by the evening meal, then lunch. Sixty-two per cent ate

all their breakfast compared to 45 per cent at lunch and 49 per cent at the evening meal.(Chapman et al., 1993)

Adequate vitamin C intake in the institutionalised elderly is still raised as an issue of concern. Preparation practices and extended cooking time means a large percentage of vitamin C is destroyed, by heat or leaching in the cooking water. It was found in one study, by the time of consumption, vegetables only had 23 per cent of the original amount of vitamin C. (Lowik, et al., 1993). In the Netherlands lower intakes of Vitamin C has been shown in women living in nursing homes (54 mg/day) compared to the independently living (132 mg/day). Clinical scurvy is seen when blood vitamin C levels are below 17 μmol . Thirty -five per cent of those women in the nursing home had serum levels as low as that found in clinical scurvy (<11 μmol) and another 23 per cent had levels which were considered low (11-23 μmol). Beverages were found to be the most important source of vitamin C for those elderly living in the nursing home.(Lowik, et al., 1993)

As mentioned earlier the elderly are renown for their low fibre intake and high prevalence of constipation. The general recommendation for dietary fibre is 30g of dietary fibre per day per person.(Better Health Commission, 1986) In an effort to reduced the need for aperients and nursing intervention in the institutionalised elderly Baghurst, et al., (1985) assessed the dietary intake of a population of institutionalised elderly patient on a fibre supplementation program. The increased fibre was shown to have a positive effect on bowel function.

2.4 NUTRITIONAL ASSESSMENT IN THE ELDERLY

One of the difficulties of studying the elderly population is finding what constitutes as 'normal ' nutritional status. The heterogeneity of the older population, and distinguishing disease related changes from those due to aging or inadequate intake or sedentary lifestyle makes assessing nutritional status difficult.(Feldman, 1993) As yet there are no anthropometric or clinical standards of nutritional status for elderly people.

2.4.1 Dietary Intake

The loss of memory, sight, or hearing that may accompany age, especially in the institutionalised elderly where there is a high prevalence of physical and psychological/mental disorders makes assessing dietary intake difficult. The accuracy and reproducibility is questionable for most nutrition survey and interview methods, including 24 hour recall, the diet history, food frequency and other food records.(ADA, 1987) Having an independent recorder who weighs the food eaten or measures plate wastage, removes the inaccuracy caused by the above issues. Zador et al. (1993) who studied the nutritional status of the elderly, assessed dietary intake using a 3-day weighed food record conducted by one observer.

Visual observation of meal consumption/ plate wastage has been shown to be less time consuming, more efficient and as accurate as when the food is physically weighed. (Graves and Shannon, 1983)

2.4.2 Anthropometric Measurements

Anthropometrics, the measurement of body size, weight and proportions can be used as a tool to monitor and evaluate nutritional status.(Chumlea et al., 1987) However for a number of the elderly, the collection of acceptable anthropometric data poses a problem, especially in institutionalised, the very old, those unable to stand such as the frail, bed fast or chair bound, or those with spinal curvature.

When stature can not be measured, **knee height** a recumbent measure can be used to estimate stature using a formula which accounts for variables such as age and sex. Knee Height, unlike stature, changes little with increasing age, yet is highly correlated with stature.(Chumlea, et al., 1985; Chumlea et al., 1987; Zeman and Ney, 1988) Body mass index (weight divided by height squared) is a simple indicator of the amount of body fat and can also be used in the elderly to monitor nutritional status.(Zeman and Ney, 1988).

2.5 DIETITIANS AND THE NURSING HOME

Eighty-five per cent of all older persons have one or more debilitating diseases which could benefit from cost-effective nutrition intervention and services. People often confuse the signs of malnutrition with the signs of aging or other health problems. Nursing homes care for sicker and sicker residents who need specialised nutrition care. However financial pressures means dietitians are minimally used and as such the nutritional needs of some residents are not properly met.(Finn, 1992)

Dietitians alone have unique skills to assess nutritional status, identify serious nutritional problems and develop intervention plans. (Finn, 1992) The fact that each elderly person has a unique profile of medications, chronic disease, likes and dislikes emphasises the importance of evaluating each older client individually. Dietitians can not only offer consultancy work, but can provide inservices to the nursing staff, cooks, kitchen hands, and to the residents themselves on suitable nutrition for the elderly.

CHAPTER THREE

METHODS

3.0 METHODS

3.0.1 Study Design

This study will look at the nutritional support provided for the elderly residents (n=48) of a private Nursing Home through;

1. Menu analysis,
2. Observed percentage of meal consumption of residents.
3. Analysis of anthropometric data taken from the residents.

Due to the decreased cognitive ability of many of the residents and their need for much of the nursing staff attention the study was designed for minimal involvement of both residents and nursing personnel. The menu analysis and visual assessment of dietary intake of the elderly was the most appropriate and reliable method for this study.

3.0.2 Ethics Approval

The methods used in the project were approved by the Human Experimentation Ethics Committee at the University of Wollongong. All subjects completed a consent form (see Appendix-5) prior to participating in the study.

3.0.3 Study Population

The total population of the Nursing Home at the time of the study was 63. All of the subjects were above the age of 65 with the exception of two people aged 63 and who had a completed consent form were participants of the study. The study population totalled 48 subjects (76 per cent participation rate). The study population was divided into sub-groups

according to a)activity level, b)medical condition and c) whether assistance with feeding was required.

Management personel stated that Dementia, Chronic Schizophrenia, Frail / Arthritic and CVA related disabilities were the main conditions which exist within the nursing home. Of the 48 residents studied, approximately 40 per cent were immobile, communication was not possible with 50 per cent due to poor cognitive functioning and 15 per cent patients required assistance with feeding.

3.1 DATA COLLECTION

3.1.1 Demographics Of Subjects

Review of resident medical notes and consultation with nursing staff provided the following information:

- | | |
|-----------------------|----------------------|
| - age | - eating environment |
| - sex | - type of diet |
| - medical condition | - eating dependency |
| - activity level | - supplement usage |
| - time spent outdoors | - bowel habits. |

This information was recorded on a subject profile sheet (Refer to Appendix 3).

3.1.2 Menu

There was no cyclic menu in place at the time of the study, but rather a daily decision was made about which foods were to be offered that day. This decision made by the cook was determined by the availability of food in storage. Each day for two weeks an extra plate of an 'average' size meal was served. The plated food items were weighed using electronic pocket scales and recorded to the nearest 1.0g. Food and drink available both between and with meals were weighed, measured and recorded. These procedures were carried out by the research student to ensure reliability of measurement.

3.1.3 Observed Percentage Meal Consumption

The quantity (as a percentage) of food items consumed for breakfast, lunch and dinner were compared against the standard meal and recorded as:

0 = none eaten (includes when one mouthful is eaten)

1 = 1/4 eaten

2 = 1/2 eaten

3 = 3/4 eaten

4 = all eaten (includes when one mouthful is left)

(See appendix-4: Meal Consumption Chart). The observation period extended over six consecutive days (including one weekend day) and was carried out by the researcher. Each subject was randomly allocated to one of the six days. On any one day between 6 to 10 subjects were being observed at a time.

3.1.4 Anthropometric Data

For each subject, height and weight were measured, and BMI calculated by the one researcher. Height was measured without shoes (adjustments were made for shoe height) using a tape measure and was recorded to the nearest 0.1cm. For those subjects unable to stand or with spinal curvature Knee Height was measured using a tape measure. The following formula is used to estimate stature:

$$\begin{array}{lcl} \text{Stature} & = & (2.02 \times \text{knee height cm}) - (0.04 \times \text{age}) \\ \text{for Men} & & + 64.19 \end{array}$$

$$\begin{array}{lcl} \text{Stature} & = & (1.83 \times \text{knee height cm}) - (0.24 \times \text{age}) \\ \text{for Women} & & + 84.88 \end{array}$$

Weight measurements were taken using either balance scales or with the assistance of nursing staff, a chair scale ramp placed over the scales for those unable to stand. All measurements were recorded to the nearest 0.5 kg. BMI [weight (kg) / height (m²)] was calculated.

3.2 DATA ANALYSIS

3.2.1 Menu

The meals on the daily menu were analysed using a food composition data base program(Xyrus software) DIET-1 version-3, which will compare the mean nutrient content of the meals provided over the two weeks against the RDI (for men 64+, and women 54+). The meals provided will be considered inadequate in any nutrient which fails to meet 100 per cent RDI.

3.2.2 Meal Consumption Data

The mean percentage of food items consumed at each meal were qualitatively analysed. Differences between 1) mobility level, 2) medical condition and 3) eating dependency in the amount of food items eaten for lunch were statistically analysed using step wise regression analysis.

3.2.3 Anthropometrics

The BMI's will be categorised against the BMI Criteria as follows;

Table 3.1 Body Mass Index Criteria

< 18	= Very Underweight	Long term hazard to health
18 - 20	= Underweight	
20 - 25	= Healthy weight	Least risk morbidity and minimal mortality
25 - 30	= Overweight	Low risk to health
30 - 40	= Morbid obesity	High degree of risk to health

Differences within Sub-groups were statistically analysed using an Anova test.

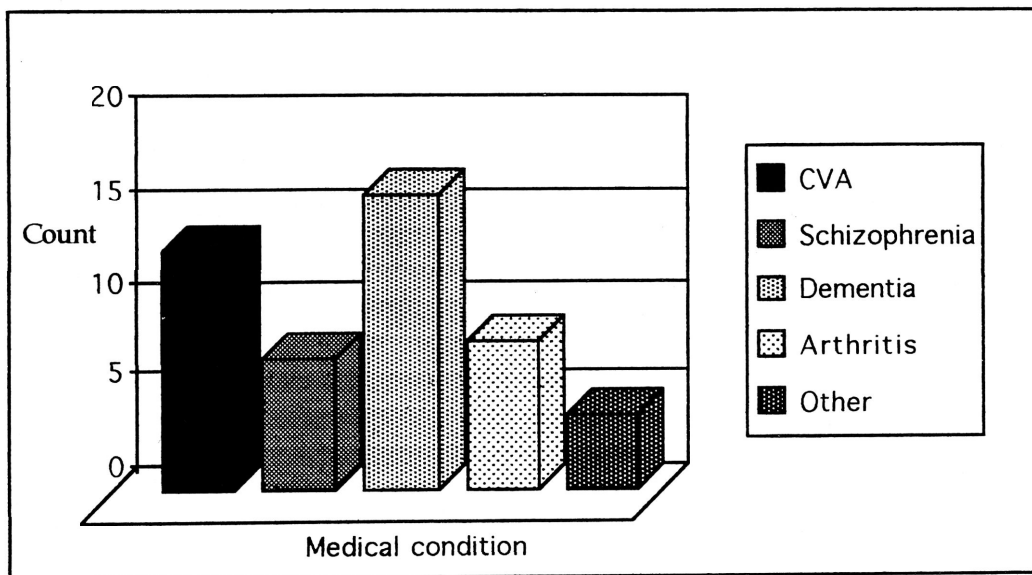
CHAPTER FOUR

RESULTS

4.1 DEMOGRAPHIC DATA

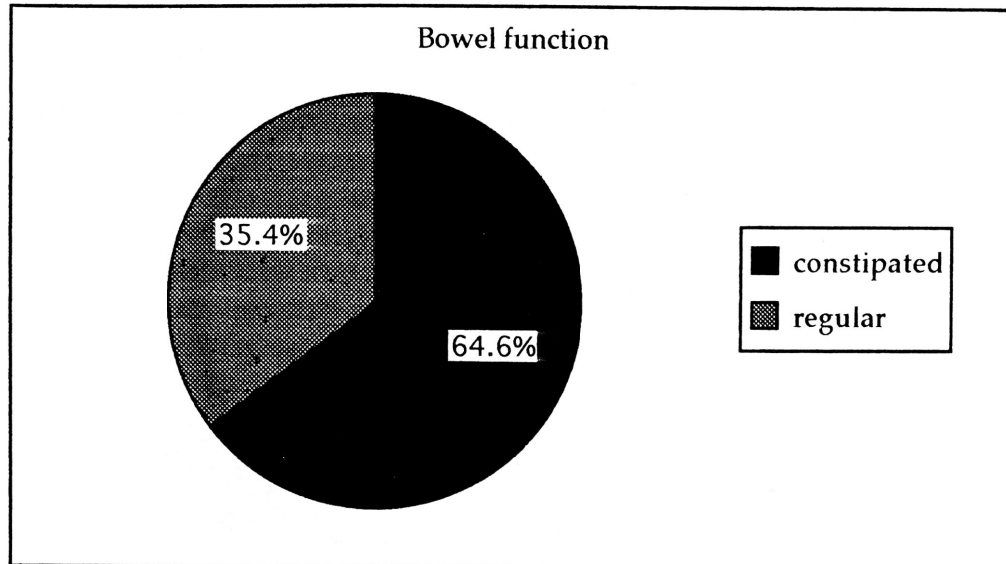
Forty-eight residents of the nursing home participated in the study, 28 of whom were women, and 20 who were men. They ranged in age from 63-102 years, the mean age being 80.7 years old. The most predominant medical condition was dementia followed by CVA related disabilities, then arthritis, schizophrenia and other (see figure 4.1.). The category other included those who were either intellectually impaired or had cancer.

Figure 4.1. Prevalence Of Medical Conditions Among Nursing Home Residents.



Bowel habits/function of the residents is illustrated in figure 4.2. A high 65 per cent of the residents suffered from constipation.(See figure 4.2)

Figure 4.2 Bowel Function.

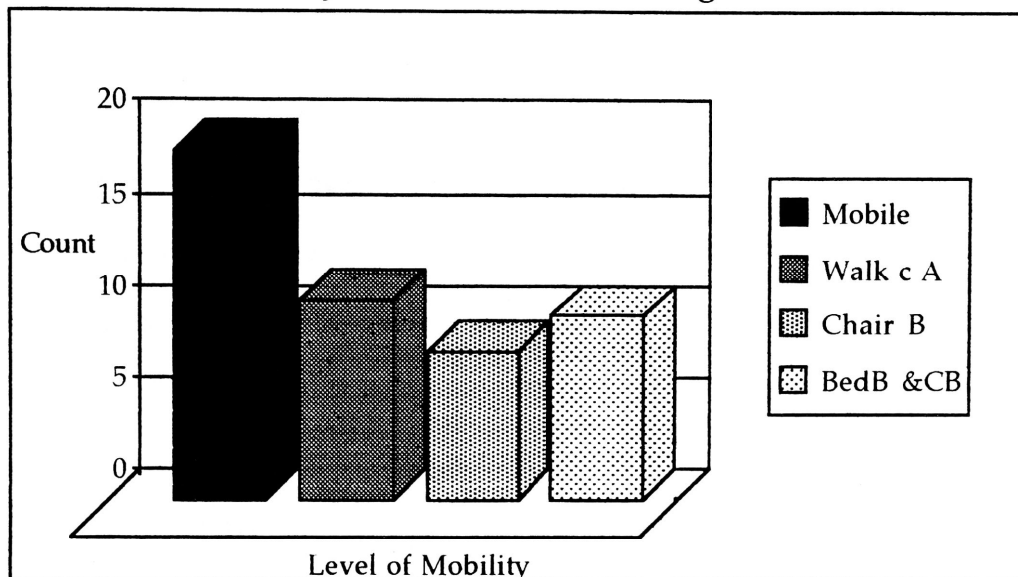


The residents all varied in degree of mobility. Figure 4.3. shows the distribution of mobility among the nursing home residents. The majority of the residents were mobile (39 per cent), 23 per cent walked with assistance, 17 per cent were chair bound and 21 per cent were bed and chair bound.

Consulting with nursing staff who were directly responsible for those residents who participated in the study revealed only 41 per cent ventured outside as frequently as weekly or more. This is illustrated in figure 4.4. Nineteen per cent ($n=9$) went outside daily, 23 per cent ($n=11$) weekly, 27 per cent ($n=13$) monthly, 25 per cent ($n=12$) in summer only and 6 per cent ($n=3$) did not go outside at all. Those who did venture outside did so by the weekly organised outings or the occasional walk to the shops/pub.

Nutrient supplements were taken by five of the residents. These included folic acid, caltrate, nicotinic acid and fibre supplements. One resident consumed over 20 different types per day.

Figure 4.3. Mobility Profile Of The Nursing Home Residents.

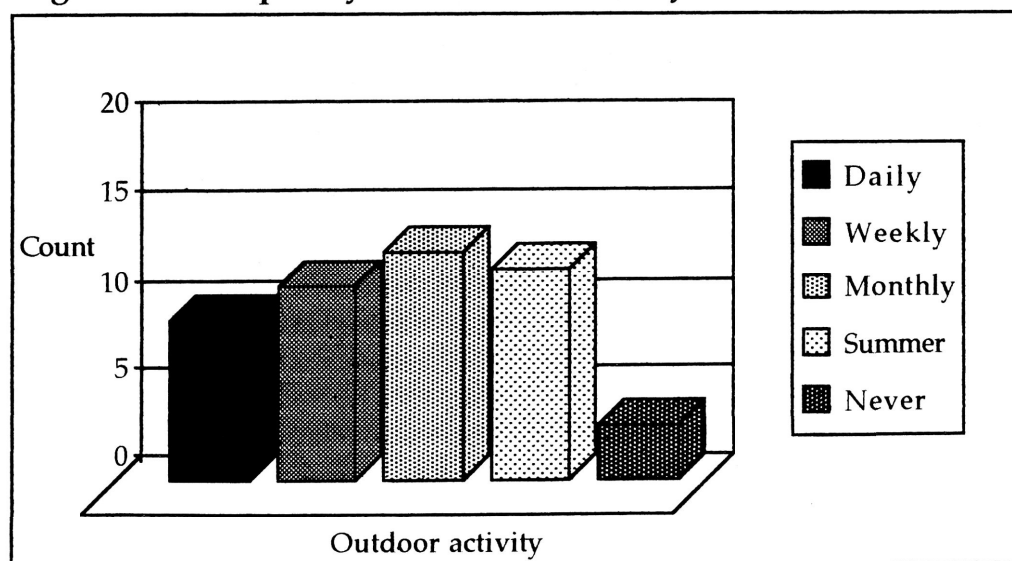


Walks c A = Walks With Assistance.

Chair B = Chair Bound.

Bed B & CB = Bed Bound and Chair Bound.

Figure 4.4 Frequency Of Outdoor Activity



4.2 ANTHROPOMETRIC DATA

The mean (\pm SD) BMI for the study population is 22.5 ± 6.0 , while the range varied from a low 15.2 to 45. The percentage of residents falling into each of the five BMI criteria can be viewed in figure 4.5. and the distribution of the BMIs is illustrated in figure 4.6. A high 46 per cent of residents fell below the healthy weight range, while 21 per cent were very underweight. Thirty-three per cent fell into the healthy weight range. At the other end of the scale a total of 4 per cent were either overweight (BMI 20-30) or morbidly obese (BMI 30-40+).

Figure 4.5 Percentage Of Residents Within Each BMI Criteria.

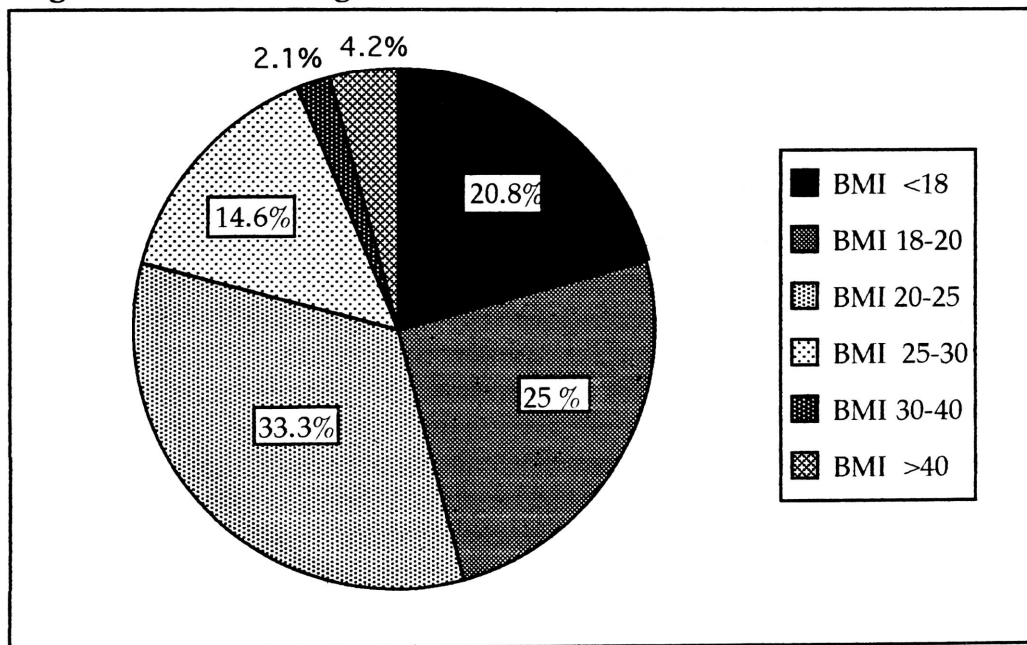
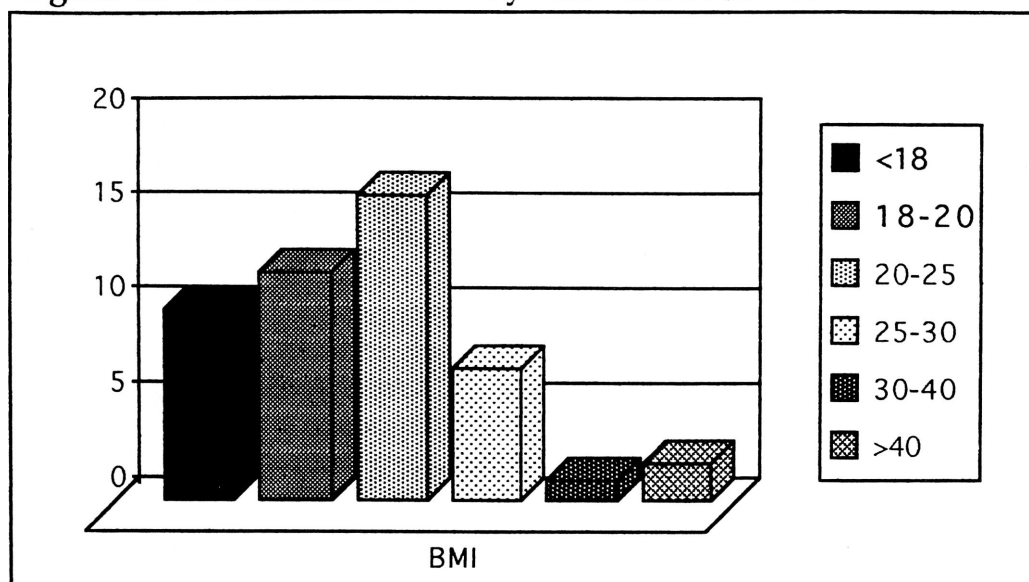


Figure 4.6 Distribution of Body Mass Index (n=48)



The mean BMI for both the subgroups 'mobility' level and the medical 'diagnosis' are shown in table 4.1. Two separate analysis of variances suggested that there were no significant differences ($P>0.05$) in the mean BMI for either of these subgroups. A two-way analysis to test for interactions between diagnostic group and mobility level was not possible due to insufficient data in a number of the combinations.

Table 4.1 Mean Body Mass Index For Mobility And Diagnostic Subgroups.

Subgroup	n	BMI (mean \pm standard deviation)
Level of mobility		
Mobile	19	22.9 \pm 5.9
Walk with assistance	11	21.5 \pm 2.8
Chairbound	8	24.4 \pm 5.7
Bed bound and chair bound	10	21.5 \pm 8.7
Medical diagnosis		
CVA	13	22.8 \pm 5.4
Dementia	7	23.5 \pm 7.7
Schizophrenia	16	21.4 \pm 4.0
Arthritis	8	24.0 \pm 9.5
Other	4	20.6 \pm 3.7

4.3 NURSING HOME MENU

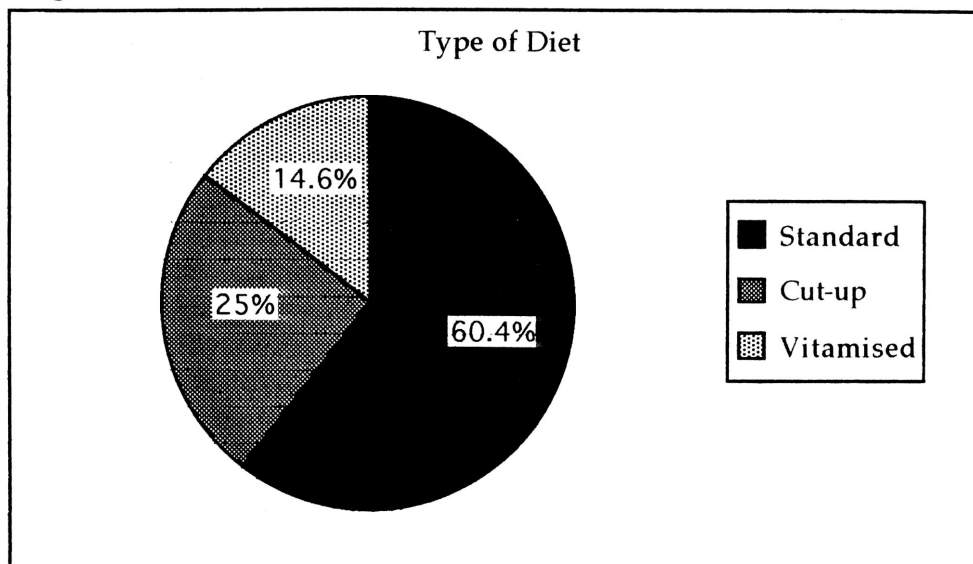
Meals were served at regular times throughout the day and followed a standard meal plan. The daily meal plan of the nursing home can be viewed in appendix-1. Meals were served to the residents in the dinning rooms, either upstairs or downstairs. However for 38 per cent of residents meals were taken to their rooms. The main meal of the day was lunch, while dinner in the evening was the light meal. Beverages such as orange juice were based on 50 per cent added water and was only provided to those residents who were either bed bound or preferred to eat in their room. A glass of milk (full cream) was given only upon special request. During 'happy hour' beer, wine and spirits were available, usually only 5-6 residents participated and the maximum allowed was two drinks per person.

4.3.1 Modified Meals

There were five types of diets offered by the nursing home, two of which were modified in texture. These included: low joule, diabetic, standard, semi vegetarian, cut-up and vitamised. A description of these meals are outlined in appendix-2.

The standard diet was provided to 60 per cent of the residents, 25 per cent had their meals cut-up and 15 per cent were given vitamised meals.(see figure 4.7.)

Figure 4.7 Texture Modified Diets.



4.3.2 Nutrient Content Of The Menu

Nutrient analysis of the menu is shown in table 4.2 together with the RDIs. There were few differences between mean nutrient levels of the 14 day menu verses the 6 consecutive days of observation. For this reason the analysis presented in table 4.2 are based on the 6 day mean. The menu met or exceeded all the RDIs for both men and women with the exception of the following nutrients;

- 21.2g FIBRE (provided 70 per cent of the RDI)
- 12mg ZINC (provided 93 per cent of the RDI)
- 276mg MAGNESIUM (provided 86 per cent of the RDI for elderly men)

Table 4.2. Nutrient Analysis Of The Menu.

Nutrient	Mean	Men > 65 years		Women >54 years	
		RDI	(% RDI)	RDI	(% RDI)
Energy (MJ) #	9.0	8.3 - 8.8	(~100)	7.0 -7.3	(~120)
Fat (g)	94.4	---	---	---	---
Protein (g)	81.1	55	(136)	45	(180)
Carbohydrate (g)	261.6	---	---	---	---
Fibre (g)	21.2	30	(70) *	30	(70) *
Vitamin C (mg)	119.9	40	(300)	30	(400)
Thiamine (mg)	1.3	0.9	(140)	0.7	(186)
Riboflavin (mg)	2.2	1.3	(169)	1.0	(220)
Niacin (NE)	27.0	16	(169)	11	(245)
Vitamin A (ug RE)	1253.3	750	(167)	750	(167)
Iron (mg)	13.5	7	(193)	5-7	(193)
Zinc (mg)	11.2	12	(93) *	12	(93) *
Magnesium (mg)	275.6	320	(86) *	270	(102)
Calcium (mg)	1303.1	800	(163)	1000	(130)
Phosphorus (mg)	1564.9	1000	(156)	1000	(156)
Sodium (mg)	3438.9	920 - 2300	(150)	920 - 2300	(150)
Potassium (mg)	3156.5	1930-5460	(~100)	1930-5460	(~100)

Estimates for Energy requirements are based on sedentary to light activity for a 70 kg man and 60 kg woman over the age of 60 years.

* Nutrients which do not meet 100% of the RDI

4.4 MEAL CONSUMPTION

The visual assessment of food items consumed revealed the maximum number of people to consume the entire menu was 50 per cent for both breakfast, lunch, and 29 per cent for the evening meal. The percentages of residents and the quantity of each food item consumed is presented in table 4.3.

Table 4.3 Proportion Of Food Consumed At Each Meal.

MEAL		PROPORTION OF FOOD CONSUMED				
% of people consuming each food item	BREAKFAST	All	3/4	Half	1/4	None
	Cereal	75 %	6 %	2 %	0	17 %
	Toast	54 %	8 %	15 %	0	23 %
	Hot dish	50 %	6 %	2 %	0	42 %
	LUNCH					
	Meat	50 %	19 %	15 %	6 %	10 %
	CHO vegetables	56 %	15 %	10 %	11 %	8 %
	Free vegetables	52 %	8 %	23 %	6 %	11 %
	Fruit	6 %	2 %	2 %	0	90 %
	Milk pudding	61 %	10 %	8 %	8 %	13 %
	DINNER					
	Soup	54 %	4 %	9 %	6 %	27 %
	Sandwich/salad	29 %	27 %	21 %	0	23 %
	Fruit	48 %	4 %	2 %	0	46 %
	Milk pudding	11 %	4 %	2 %	6 %	77 %

For each of the food items (meat, Carbohydrate and free Vegetables, fruit, Milk pudding) eaten at lunch, a Man Whitney U test indicated no significant differences ($P > 0.05$) in the amount consumed when comparing the two groups, that is those assisted at meals and those who were not assisted. A step wise regression analysis also indicated no significant differences ($P > 0.05$) when comparing 1) mobility levels and 2) medical diagnosis.

Although statistically there were no differences found, from the perspective of an observer those who were assisted with meals consumed every item of food offered. There were a number of isolated cases in which food intake was detrimentally affected. Two residents with severe dementia often forgot what food was, what they were meant to do with the food and how to eat it. One resident required assistance with eating and the other needed detailed instructions on how to eat the food. Another individual with poor eye sight frequently complained of hunger and asked for more food. Upon inspection, the majority of the food had spilt into his lap.

CHAPTER FIVE

DISCUSSION

5.0 DISCUSSION

The standard menu provided by the nursing home was adequate for most nutrients, meeting the RDIs. However at the individual level not all residents consumed the entire menu as provided to ensure an adequate nutritional intake. Nutrients which were of greatest concern will be discussed in further detail.

As pointed out in the results, a maximum of 50 per cent of residents ate all of both breakfast and lunch and 29 per cent ate all of the evening meal. Those residents who did not consume all of the menu as offered may not be meeting their energy requirements. This point was supported by the fact that 46 percent of residents had BMIs below the healthy weight range.

By not collecting data on admission weight and weight change in the study design, it is recognised there can be no direct association made between low BMI's and the menu. Many of the residents may have been underweight on admission to the nursing home. However a reduced intake of food at the level of the individual may be associated with low BMI's.

The incidence of underweight in the nursing home is similar to the 50 per cent found by Goodwin(1989), 50 to 85 per cent by Fisher et al.,(1990) and not surprisingly a higher incidence than the 29 per cent found in a study which looked at another nursing home in the Blue mountains area, but which excluded subjects at highest risk of undernutrition.

It was expected that the quantity of food consumed by the individual would be dependent on whether they were assisted with feeding, their level of mobility or medical diagnosis. During the observation of food intake, those residents with severe dementia were not consuming all of their meals, while those who were bed bound and assisted with feeding manage to consume all food offered to them. Statistically no differences were found. Seibens and associates (1986) also found no association between food intake and eating dependency.

A probable explanation was the lack of numbers in each subgroup combined with the broad grouping of medical diagnosis and the fact that each subject was at a different stage of their condition. For example a person suffering with mild dementia, may simply have the occasional short term memory loss, whilst in the case of severe dementia, the eating process itself may be forgotten.

Meat consumption was low for a number of the residents. Only 50 per cent consumed all the meat. This raised the question, are they getting/ consuming enough protein in their diet? Based on the menu offered, those residents who consumed less than three quarters of the meat may have an inadequate protein intake, while those who consume less than half may not be meeting their iron requirements. It is worth mentioning, due to the frequent incidence of illness and the negative effect this has on nitrogen balance, protein requirements may actually be higher than the RDI for the healthy individual, placing at risk those who eat less than all of their meat.

All residents consumed a diet low in fibre. The reason appeared to be a preference for refined foods when given a menu choice, even though wholemeal bread and high fibre breakfast cereals were made readily available. The high prevalence of constipation is not surprising when you consider the low fibre intake of the residents and their reduced mobility.

The menu provided 300 to 400 times the RDI for vitamin C and as such the risk of vitamin C deficiency of the residents as a group was low, unlike that of vitamin D.

Those residents (59 per cent) who did not have exposure to at least 1-2 hours of direct sunlight per week may be at risk of vitamin D deficiency, especially those who were taken outside only during summer. Many of the residents falling into this category included the very frail and the bedbound. None of the residents were provided with a Vitamin D supplement, even though it is one of the guidelines listed in the 'Guidelines For Nutritional Care and Food Service in Nursing Homes'. These findings were also noted by Chapman et al., (1993) of the 13 nursing homes studied none provided vitamin D supplements.

From the perspective of a dietitian, it can be easy to recommend healthier food options for elderly to improve their nutritional well being. However theory can be very different from reality when trying implementing changes where the institutionalised elderly are concerned. Great emphasis is placed on the personal rights and freedom of choice of the resident within the nursing home. No individual was made to eat anything they

wish not to and for a number of residents choosing an alternative, may prove difficult.

5.1 IN CONCLUSION

The standard menu was adequate in most nutrients, however not all the residents consumed the minimum amount of food necessary to ensure an adequate nutritional intake. No specific 'sub-groups' within the study population were identified as being at higher risk of undernutrition. It is concluded that nutritional needs of each resident are very individual, and the focus needs to be directed more towards the individual and their level of food intake and not so much the menu in the development future studies and intervention plans.

CHAPTER SIX

LIMITATIONS

and

RECOMMENDATIONS

6.1 LIMITATIONS

1. The presumption that RDIs established for adults apply equally to older age groups and especially to those with a particular disease state or who are on medications.
2. The measurement of Knee Height using a tape measure instead of the recommended sliding scale calliper in the estimation of stature in the elderly.
3. The menu analysis was based on the standard reference meal, However no standard recipes were strictly followed and the size of the meal given to the resident varied depending if they were known to be a 'big eater' or a 'small eater'.
4. The observation of food consumption of more 6-10 people at a time in various areas of the nursing home, exacerbated by forgetful staff meant food was occasionally taken away before being sighted and information had to be obtained from the memory of the person who removed the plate.

6.2 RECOMMENDATIONS

1. For further studies to be conducted with the elderly to establish changes in body weight and BMI that are representative of true aging rather than the disease state itself or sedentary lifestyle.
2. The development of RDIs specifically for the elderly addressing those greater than 65 years and those older than 80 years of age. They should be set not only for the healthy, but also for those who are sick or dysfunctional.
3. The development of nutritional supplement/support drinks specifically for the elderly population and those with compromised health.
4. For researchers planning similar studies in the future it is recommended that, a larger sample group be studied with more discrete classification of medical diagnosis; sliding skin fold callipers be used in the measurement knee height; and the measure of dietary intake be assessed using weighed food intake records (if time is not an issue) conducted by the researcher.

6.2.1 Recommendations For The Nursing Home

1. The use of nutritional support drinks such as enriched milk (addition of eg. Sustagen, skim milk powder, Promode, Polyjoule etc) between meals for those residents of low weight/ BMI, or who are unwell.

2. The use of an oral supplement of 5-10 ug vitamin D per day for those resident who are not exposed to 1-2 hours of direct sunlight per day.

3. To slowly incorporate foods higher in fibre which at the same time will not displace the intake of other essential nutrients and energy in the diet. For example anzac or wheatmeal biscuits and increasing the proportion of wholemeal flour in suitable baked goods, fibre enriched white bread.

4. To make use of services provided by a dietitian on a consultancy basis for;

a) individual nutritional assessment and intervention plans for residents who are either below the healthy weight range, experiencing a weight loss of more than three kilograms, require special dietary modification, or have problems with eating.

b) to work in conjunction with catering staff in the development of a menu, and recipes which entice the residents to consume greater quantities of food, which are also economical and nutritional.

c) providing inservice programs on 'healthy eating and good nutrition in the elderly' to not only nursing staff, cooks and kitchen hands, and also practical education sessions with food for the residents themselves. For example tasting foods which are higher in fibre .

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APPENDICES

APPENDIX 1: DAILY MEAL PLAN OF THE NURSING HOME.

6.30am	Early morning tea	- Tea/coffee - Biscuit (plain)
7.30am	Breakfast	- Cereal (cornflakes weet bix, porridge) - Toast (predominantly white) - Hot dish (spaghetti, baked beans, egg etc.) - Tea/Coffee
10.30am	Morning tea	- Fruit (1/4 orange, banana etc) - Tea/coffee
12.00pm	Lunch	- Hot meal (meat and three vegetables) - Dessert - Cordial/Juice
2.00pm	Afternoon tea	- Baked goods (cakes, scones, pikelets etc.) - Tea/coffee
4.00pm	Happy hour	- Beer, wine, or spirits
5.00pm	Dinner	- Soup (mostly clear vegetable based) - Assorted sandwiches <u>or</u> Salad (including meat/egg/cheese + bread) - Fruit <u>or</u> dessert - Tea/coffee
7.00pm	Supper	- Biscuits/cake/sandwiches - Tea/coffee

APPENDIX 2: SPECIAL DIETS OF THE NURSING HOME

Low calorie =	<ul style="list-style-type: none">- salads for dinner- fruit for dessert- smaller serving size of most food items.
Diabetic =	<ul style="list-style-type: none">- no added sugar- no food providing concentrated sources of sugar- carbohydrate foods are served freely, no portions or exchanges are used.
Semi Vegetarian =	<ul style="list-style-type: none">- avoidance of meat type known to be disliked by the individual. (note: this can change from day to day)
<u>Texture modified</u>	
Cut-up =	<ul style="list-style-type: none">- foods eaten with utensils are cut into a manageable size
Vitamised =	<ul style="list-style-type: none">- foods on the menu which are not in a smooth consistency are pureed.- milk pudding type desserts often replace fruit.

APPENDIX 3: SUBJECT PROFILE

Name: _____ D.O.B: ____/____/____

Diagnosis: _____ Age: _____

Sex: M/F

Presenting Symptoms/Nutrition related conditions: _____

Constipation: YES/NO Aperient use: yes/no

Knee Ht: _____ cm.

Height: _____ cm. Weight: _____ kg. BMI: _____

Communication ability: poor/ good.

Dentition: own teeth/ dentures/ edentatus.

Activity Level: -mobile.
 -walk with assistance.
 -chair bound.
 -bed & chair Bound.

Outdoor Activity: daily/ weekly/ monthly/ summer/ never.

Meal Environment: bed/ bed Rm/ dinning Rm.

Assistance with feeding: YES/NO

Type of Diet: normal/ soft/ pureed/ other _____.

Supplements taken: _____

APPENDIX 4: MEAL CONSUMPTION CHART

Name: _____ Date: _____/_____/93

Food Items of Meal	B'fast	Lunch	Dinner
Toast: brown/ white			
Porridge			
Cereal			
Egg/ Omelette			
Other:			
Meat/ fish.			
Rice/ pasta/ potato			
Other veg.-Yellow			
-Green			
-White			
Salad			
Sandwich			
Soup			
Bread: white/ brown			
Milk pudding: custard/ yoghurt/ ice cream			
Fruit: Fresh/ stewed			
Other:			
Tea/ Coffee:			
Juice			
Milk			
Lemonade/ Cordial			
Sustagen			
% Eaten: 0=none, 1=1/4, 2=1/2, 3=3/4 4= All.			

Comments: _____

APPENDIX 5: CONSENT FORM

The study "Nutrition and the Elderly Private Nursing Home Residents" is being conducted as a part of a Master of Science (Nutrition & Dietetics) degree at the University of Wollongong under the Supervision of Ms J. Mc Arthur.

I hereby give consent to participate in a study which involves being observed at meal times and the measurement of my height and weight.

I understand all information is confidential, that I will not be identified in the study, that I am free to withdraw at any time of the study and that non-participation will not affect my treatment .

Date:____/____/93

Name:_____

Signature:_____

Any inquires regarding conduct of research may be forwarded on to the secretary of the University of Wollongong Human Experimentation Ethics Committee (Phone: 042 213079)